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Measuring orthographic and phonological vocabulary size in EFL learners: the impact of cognateness and out-of-school exposure

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Abstract

The present study compares the orthographic and phonological vocabulary size of second language (L2) learners in intermediate-advanced stages of language acquisition and investigates the impact of cognateness and out-of-school exposure across vocabularies. Ten Spanish-Catalan bilinguals and twenty Italian university learners of English were administered with two comparable vocabulary size tests adapted from the V_Yes/No vocabulary size test. Evidence of a significant gap between the orthographic and phonological vocabulary size in favour of the former was found. As V_Yes/No employs both real words and nonwords, the target items in the vocabulary tests which overlapped with learners' L1 were coded as cognates or nonword-cognates. Upon closer examination of these items, a positive relationship between cognateness and learners' lexical choices was revealed. Furthermore, by means of a questionnaire, data regarding learners' out-of-school exposure to English was gathered. Correlation analyses revealed differences between the two input modalities; significant relationships were found between the orthographic vocabulary size, watching captioned audio-visual material, reading and listening to music. The strongest correlation with phonological vocabulary size was instead obtained with reading. Pedagogical implications which could bridge the divide between the orthographic vocabulary and its phonological counterpart are discussed.

Keywords: vocabulary knowledge; orthographic vocabulary; phonological vocabulary; cognate recognition; nonword-cognate; out-of-school exposure.

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Table of Contents

1. *Introduction*

Over the last few decades, vocabulary has come into the spotlight of many researchers in the field of second language acquisition (SLA), attempting to unravel some of the mysteries beneath L2 learners' lexical dimensions (Meara, 2002). Vocabulary size has been found to be an accurate predictor of learners' proficiency level and, as a result, an increasing number of studies have been exploring the size of learners' lexicon and its impact on language proficiency in the four main sub-skills, namely: reading, writing, listening and speaking. Findings have revealed moderate or strong correlations between receptive vocabulary, proficiency and the four sub-skills (Milton et al., 2010; Miralpeix & Muñoz, 2018) or between vocabulary scores, reading, listening, and writing (Stæhr, 2008), concluding that a bigger vocabulary is the stepping stone to further progress and achieve a higher level of proficiency in the L2. Amongst the studies that have assessed learners' vocabulary size, there has been a tendency to employ vocabulary size tests that tap into orthographic word recognition, such as the Vocabulary Levels Test (VLT) or V_Yes/No vocabulary size test. According to Nation's framework (1990), these tests would specifically assess orthographic word recognition, giving researchers estimates of learners' vocabulary size. Identifying a word in its orthographic form does not however necessarily imply recognition in its aural form. L2 learners could indeed identify some words in their spoken form, but not in the written one, and vice versa, and this potential asymmetry among the two learning modalities could lead to erroneous approximations of the vocabulary size. Milton claimed that "it is possible to learn a language by sound only and never learn to read or write in it" (2009:93), which highlights the importance of validating vocabulary size in both orthographic and phonological forms to have accurate estimates of one's lexical knowledge. Instead of examining learners' vocabulary size, some tests that measure the depth of knowledge, i.e. how well words are known, have become popular, such as the Vocabulary Knowledge Scale (Wesche & Paribakht, 1996) or the Word Association Test (Read, 1993). Although these tests aim to obtain a more holistic view of learners' word knowledge, due to the difficulties in their design, administration, and assessment, many researchers have leant towards measures of vocabulary size, as by examining only one aspect of word knowledge, i.e. form recognition, the likelihood to obtain accurate results is higher.

The few studies conducted so far that have assessed the orthographic and phonological vocabulary size of learners of English as a Foreign Language (EFL) have demonstrated that they are often not equivalent. The differences between the two vocabularies have been explained in terms of age and proficiency factors. Regarding the former, children appear to have greater phonological

vocabularies, whereas, advanced learners seem to recognise more words in their orthographic form. This calls for further studies that take into consideration different contexts and learners' first languages (L1s). Additionally, many studies on vocabulary found that the presence of cognateness was one of the main predictors for word recognition (Kohnert et al., 2004; Muñoz in press a). It is unclear, however, if learners benefit equally from the presence of cognates in orthographic and phonological vocabulary tests. Still remaining to be explored, is the impact of the type and frequency of activities that learners have contact with on a daily basis, on, and across vocabularies. In our current society in which EFL learners are constantly and regularly exposed to English input beyond the classroom, creating ample opportunities for incidental vocabulary uptake, it is timely to investigate its effect on learners' vocabularies. This could yield precious insights on which types of out-of-school activities are beneficial for vocabulary gains, and whether they equally affect measures of orthographic and phonological vocabulary size.

The present study sets out to analyse whether there are differences in the orthographic and phonological vocabulary size in intermediate-advanced EFL learners. It also examines the impact of cognateness on learners' vocabulary scores, as well as the role that learners' engagement in out-of-school activities plays on learners' vocabularies. In the following section, an overview of the main studies which have compared the orthographic and phonological vocabulary size in EFL learners will be addressed, followed by a review of the main studies on the impact of cognates in vocabulary tests and out-of-school exposure for vocabulary development.

2. *Literature review*

2.1. *Orthographic and phonological vocabulary size tests in SLA*

Recent studies which have examined EFL learners' orthographic and phonological vocabulary size have demonstrated the importance of employing two different tests that tap into written and spoken modalities of word recognition for obtaining more accurate estimates of learners' lexical competence. Subsequently, with the aim to provide a complete picture of EFL learners' vocabulary size in both the orthographic and phonological form, an increasing number of tools that also gauge L2 learners' phonological vocabulary size (PVS) have been developed. The majority of these tests are constructed in the format of multiple-choice (Aizawa et al., 2017; Mizumoto & Shimamoto, 2008) or partial dictation (Cheng & Matthews, 2018). For instance, Fountain and Nation (2000) designed a series of comparable dictation tasks, which test learners' vocabulary from different

frequency levels. These dictation tasks not only aim at measuring learners' vocabulary size but also provide insights into several aspects of word knowledge; the authors expected that those items that learners know the meaning of exclusively, as well as their grammatical functions and collocations, will be recognised and correctly spelt. Nonetheless, it is doubtful whether learners' correct spelling of a word implies having knowledge of the different aspects of vocabulary.

Aural Lex is another popular test which assesses phonological vocabulary size by presenting words out of context (Milton & Hopkins, 2006). In order to compare the results of this test with the orthographic counterpart, it was constructed by following the same criteria used by Meara and Milton's X_Lex (Meara & Milton, 2003). These tests consist of 120 items from the first five frequency levels, and what differs is the modality in which words are presented, either written or spoken. To control for learners' guessing behaviour and overestimations of their vocabulary size, half of the items are pseudowords. Ticking to know these non-existent words would cause false alarms, and learners' final scores would be lowered. By using this scoring system, research has shown that not only are Yes/No vocabulary size tests valid measures of learners' lexical knowledge but they also significantly correlate with other vocabulary size test types (Meara & Buxton, 1987).

Having two vocabulary tests that assess learners' orthographic (X_Lex) and phonological (Aural Lex) vocabulary size and follow the same criteria enables a researcher to compare the two scores and to explore the dissimilarities between the two vocabularies. With the aim to investigate and compare the vocabulary size of EFL learners with different mother tongues, ages and proficiency levels, Milton and colleagues carried out several studies (Alhazmi & Milton, 2015; Milton & Hopkins, 2006; Milton et al., 2010). The results in Milton and Hopkins's study with Greek and Arabic EFL learners with different proficiency levels (from beginners to advanced) and ages (from seven years old to adults) revealed a significant superiority of the OVS over the PVS in the Greek participants. On the other hand, there were no significant differences in the Arabic learners' vocabularies, although they had a slightly bigger PVS. The dissimilarities between the two cohorts, even when controlling for age and proficiency level, suggest that differences in the modalities in which input is yielded through formal instruction or out-of-school exposure could have an impact on their vocabularies (Mizumoto & Shimamoto, 2008). In the same study, Milton and Hopkins also examined the role of proficiency and age and found that children, regardless of their L1, had greater phonological vocabularies due to their limited orthographic skills and minimal exposure to written input. It appears that only when learners start to develop orthographic skills and begin reading and writing, their OVS will develop and ultimately outpace the phonological vocabulary. According to Milton (2009), after having mastered the most frequent words in English, L2 learners will encounter

new words mainly in the written form since the majority of words used in everyday speech pertain to the high-frequency bands and are likely to be learnt in the first stages of language development. As a result, advanced learners' lexical knowledge would be composed of high-frequency words in both the written and spoken form, and some of the low-frequency words in the written form only.

To investigate why L1-Arabic learners have a greater PVS, further studies were conducted with Arabic intermediate and advanced learners of English, as well as learners with different L1s, such as Japanese and Chinese (Alhazmi & Milton, 2015; Milton et al., 2010). Results were expected to show an advantage of the orthographic vocabulary, and this was the case for all the participants, but the L1-Arabic ones. In line with previous research, the findings of these studies confirmed that L1-Arabic learners do not follow the expected pattern that would show a clear superiority of the OVS, especially in advanced stages of language development. Still, studies that have measured OVS and PVS with different orthographic and phonological vocabulary tests are consistent in showing an imbalance of lexical knowledge in favour of OVS in Japanese EFL university students with different proficiency levels (Aizawa et al., 2017; Mizumoto & Shimamoto, 2008) and Korean middle-school beginner and intermediate EFL learners (Kim, 2019). From these studies, one could conclude that, regardless of the proficiency level and with the exception of L1-Arabic learners, English learners tend to have a bigger orthographic vocabulary, provided that they have developed sufficient orthographic skills.

2.2. *The role of cognates in vocabulary tests*

Vocabulary size tests measure learners' lexical knowledge by randomly selecting words from different frequency levels. Be it with phonological recognition and picture association (e.g. Peabody Picture Vocabulary Test - PPVT), multiple choice (e.g. VLT) or Yes/No format (e.g. V_Yes/No), vocabulary size tests are built on the same criterion; they select random words. Even though they are meant to be language-neutral and administered to learners regardless of their L1s, research has highlighted that the presence of cognates might facilitate some learners from certain L1s over others. Cognates are words that branched off from the same parent language, and although might have developed differently, they bear resemblance in form and meaning. Research has shown that cognates are easier to recognise and retain, especially when reading (Rodríguez, 2001) since English cognates with Romance languages, for instance, are often not transparent in their phonological form. Researchers distinguish cognates that (1) can be recognised in their aural and written form (e.g. Eng. horrible - Spa. horrible); (2) cognates that can easily be recognised in their written form only (e.g.

Eng. mediocre - Spa. mediocre); and (3) false cognates, i.e. words that although share the form, differ in meaning (e.g. Eng. embarrassment - Spa. embarazada).

In the process of evaluating the presence of cognates, there has been a tendency for researchers to classify words as either cognates or non-cognates; it is expected that the former will be recognised more easily, which could be shown through shorter response times and greater accuracy scores. On the other hand, a few studies have adopted a perspective which considered the extent to which two words orthographically and/or phonologically overlap by utilising a Likert scale (Kohnert et al. 2004) or a mathematical function (De Wilde et al., 2019a). Even though both *airport* (Spa. aeropuerto) and *bank* (Spa. banco) are cognates with Spanish, using a Likert scale enables to display that the latter overlaps to a greater degree with the Spanish counterpart, and should, therefore, be more easily recognisable. By means of a Likert scale researchers also consider aspects which could potentially facilitate word recognition, such as stress placement and number of syllables, which would be neglected with a categorical classification of cognates. In De Wilde et al.'s study (2019a) with L1-Dutch primary-school children in Belgium, the authors operationalised cognateness by measuring the Levenshtein distance-function, a mathematical function which gauges the number of modifications necessary to have two identical strings (Schepens et al., 2012). Both the Likert scale employed by Kohnert et al. (2004) and the Levenshtein distance-function (De Wilde et al., 2019a) are objective measurements that lay emphasis on the wide diversity of cognates, determining which words within the cognate category will be more easily and likely recognised due to stronger similarity.

In order to control for the cognate facilitation effect, in a few studies researchers opted to administer a vocabulary test excluding all the cognates with the participants' L1 (Peters et al., 2019). In doing so, however, these authors administered a vocabulary test which perhaps was not fully representative of the English lexicon, which is pervaded by Latinates and words of Germanic or Greek origin. Additionally, research has shown that multilingual learners might be equally facilitated in recognising words through other languages beyond the L1 (Rast, 2010; Van Hell & Dijkstra, 2002). Van Hell and Dijkstra's study (2002) with trilingual native Dutch university students aimed to examine the role of second and third languages in the mother tongue. The participants of this study were very proficient in English (L2), and either beginner or advanced speakers of French (L3). With a series of lexical decision and word association tasks in the participants' L1, the results revealed that the participants were faster at recognising cognates with English or French than non-cognates, confirming the assumption that additional languages can have an impact on the L1. Nevertheless, only the highly proficient participants in French were facilitated by the presence of cognates, suggesting that a minimum threshold must be reached before transfer from an L2 can occur. It

appears, therefore, insufficient to only control for the L1 since knowledge in other languages might also play a role when taking a vocabulary test.

Centuries of colonisations, expansions and language contact have created an English lexicon that abounds in cognates, mainly with Romance and Germanic languages. As a result, it is fundamental to take into account the role of cognates when comparing vocabulary scores among participants whose L1s differ. In Muñoz et al.'s comparative study (2018) with 7- and 9-year-old EFL Danish and Spanish-Catalan children, the receptive vocabulary size scores (measured with PPVT) were significantly correlated with the presence of cognates, and specifically, the Danish children showed an advantage over their Spanish-Catalan cohorts. This was due to the numerous cognates between English and Danish in the first frequency levels and because these cognates tend to be phonologically transparent. On the other hand, cognates with Spanish, Catalan or Romance languages in general, are not only more difficult to spot and recognise but also often low-frequency words. Speakers of Romance languages are likely to benefit to a greater extent from the presence of cognates in not beginning stages of language acquisition when the opportunities to encounter cognates are superior (Muñoz et al., 2018; Stadthagen-González et al., 2013). In line with other studies (Muñoz in press a), Muñoz et al.'s study (2018) also revealed a positive correlation between age and cognate recognition with the older cohort who outperformed the younger one due to greater metalinguistic skills and bigger vocabularies. Nevertheless, it appears that while mastering a language, the cognate facilitation effect is gradually mitigated as learners broaden their lexical knowledge (De Wilde et. al, 2019a; Laufer & McLean, 2016; Stadthagen-González et al., 2013).

When learners take a vocabulary test they are likely to encounter some cognates, and in these situations, the chances to recognise and accurately associate the meaning of words increase. If the majority of tests only present real words, Yes/No vocabulary tests are equally composed of nonwords with the aim of controlling for the effect of guessing. The criterion employed to create nonwords consists of selecting a random sample of real words and changing some of the graphemes to create non-existent words. It might be the case that some of the words selected were originally cognates, and therefore, a learner will recognise the form (written and/or spoken) of the made-up word as familiar and might be tempted to consider the nonword as a real word. Likely, this would especially occur with L2 learners who are not yet familiar with the morphology of the target language and have trouble distinguishing real words from similar made-up words (Meara & Miralpeix, 2017). Should *nonword-cognates* be included in a vocabulary size test? These words could potentially prompt learners to commit an error, and as a result, lead to underestimates of their lexical knowledge. No studies to date have been carried out on the role that nonword-cognates have on test-takers' lexical

decisions and final scores, although this could represent a key issue especially when comparing vocabulary scores among EFL learners with different L1s.

2.3. *Out-of-school exposure to English*

In the era of English as the global Lingua Franca, English learners continue exploring more opportunities to enhance their language proficiency beyond the walls of the classroom through a variety of out-of-school activities. According to a survey reported by the European Commission with participants from fifteen European countries (Eurostat 2015), almost 90% of respondents reported daily exposure to screen-related activities, with an average of three hours per day. Additionally, more than 85% of the households in Europe have internet access, based on the results of another survey conducted by the European Commission (2016). The abundant opportunities to encounter English outside traditional settings have been proven to promote certain aspects of the language learning process that are often neglected in classroom environments in various studies across Europe, namely, Sweden (Sundqvist & Sylvén, 2014; Sylvén & Sundqvist, 2012), Denmark (Hannibal Jensen, 2017; Muñoz et al., 2018) and Flanders (De Wilde & Eyckmans, 2017; De Wilde et. al., 2019b; Peters et al., 2019). Furthermore, a comparative study from Lindgren and Muñoz (2013) with 10-year-old participants reconfirmed the positive impact of daily exposure to English in out-of-school environments among seven European countries.

In order to shed light on the types of out-of-school activities preferred and their impact on vocabulary development, SLA research has also attempted to examine the contribution of individual differences, such as gender and age. Regarding gender, studies have shown significant gender-related differences both in the frequency and type of out-of-school activities that learners have contact with. Gaming appears to be one of the activities which reflects the major differences, and studies consistently revealed that primary school boys significantly play video-games more than girls in Sweden (Sundqvist & Sylvén, 2014; Sylvén & Sundqvist, 2012), Denmark (Hannibal Jensen, 2017) and Catalonia, Spain (Muñoz, 2020). Muñoz's study (2020) also revealed gender-related differences in watching audio-visual input, listening to music and reading across different ages (12-39). On the other hand, regarding age-related differences, the field lacks longitudinal studies that could examine the development of out-of-school activities over time. Puimège and Peters (2019) explored the differences in primary school participants' out-of-school activities by conducting a study with 4th, 5th and 6th-grade Flemish students who had not received formal instruction. The findings disclosed significant differences in terms of passive exposure (listening to English songs, watching movies or

programmes in English), gaming and video streaming, with the 6th-grade students who engaged in English activities more than the 4th-grade. In Muñoz's study (2020) significant age-related differences emerged among the three age groups (12-14, 15-17 and 18-39) in the frequency and the types of English out-of-school activities that learners were exposed to. With a very large sample, this study showed that the adult participants engaged in watching audio-visual input and reading activities in English more than the younger cohorts, who conversely preferred gaming and listening to music. From the few studies which considered age, it appears therefore that learners' contact with English out-of-school and their opportunities for incidental vocabulary learning change over time, but still more studies are needed to examine the contribution of this factor in different contexts.

2.4. *Out-of-school activities for vocabulary development*

Research has shown that listening to music and watching English television with or without subtitles are amongst the most popular out-of-school activities. Regarding the former, mixed findings failed to determine and gauge its effectiveness for vocabulary development (De Wilde et al., 2019b; Lindgren & Muñoz, 2013; Peters et al. 2019). In some cases, positive correlations between listening to English music and vocabulary scores (Puimège & Peters, 2019) have emerged. Other studies, however, pointed at either no correlations (Muñoz et al., 2018) or negative correlations (De Wilde et al., 2019b). According to De Wilde et al., the negative relationship in their study could be explained by the fact that not only do L2 learners often not focus on the lyrics but that listening to music also reduces the time that EFL learners devote to more effective activities, such as gaming and using the computer.

With respect to watching television and films, research showed overall positive correlations with receptive vocabulary scores (Koolstra & Beentjes, 1999; Peters & Webb, 2018). Nevertheless, the majority of these studies were conducted in countries in which English television programmes are rarely dubbed. In Muñoz et al.'s study (2018) with Danish and Spanish-Catalan primary-school students, the findings highlighted that the latter participants seldom engaged in audio-visual activities. Spain has traditionally dubbed English programmes into the local language, and primary-school children might not have the interest and language competence to watch movies in English. Watching English television might be, therefore, especially beneficial for vocabulary development to those learners who frequently engage in this type of out-of-school activity and whose language distance between the L1 and English is small. Research has often considered languages such as Dutch (De Wilde et al., 2019b; Koolstra & Beentjes, 1999; Peters & Webb, 2018) or Danish (Muñoz et al.,

2018), in which the central role of cognates for word recognition and word learning has come to light. Indeed, according to Webb and Rodgers (2009), 85% of the words in television pertain to the first frequency band, among which many words are cognates with Germanic languages (Muñoz et al., 2018).

The simultaneous exposure to visual, auditory and/or textual input has proven to be facilitative in word recognition and incidental vocabulary uptake, as compared to unimodal input activities (Bisson et al., 2014; Markham, 1999; Peters et al., 2016; Vanderplank, 1988; Winke et al., 2010). This is corroborated by the findings in Koolstra and Beentjes' study (1999), in which the participants who watched English programmes with subtitles in the L1 had greater gains in terms of vocabulary, as well as the results in Hannibal Jensen's study (2017), in which the vocabulary scores of Danish primary school students were strongly correlated with the participants who were exposed to multimodal input while gaming. However, research has also shown that especially beginner learners might be overwhelmed by the simultaneous exposure to input from different modalities, and due to their limited attentional resources, they might not be able to process all the input they are provided with. In Sydorenko's study (2010) beginner L2 Russian learners were divided into three groups and exposed to either video with audio and captions, video with audio only, or video with captions only. The findings revealed that the participants who were provided with captions outperformed those participants who were not for written recognition. In contrast, the reverse condition occurred for aural recognition, suggesting that when learners are not provided with captions they necessarily pay more attention to the soundtrack, enhancing the opportunities of vocabulary uptake in the phonological form. Even though beginner learners might not be able to process all the input simultaneously, intermediate and advanced L2 learners appear capable of processing concurrent exposure to input at the same time (Jelani & Boers, 2018).

2.5. Justification of the study

The majority of studies that assessed EFL learners' lexical knowledge have employed a vocabulary test that exclusively taps into orthographic word recognition, and only recently has the importance of using measures that consider both the written and spoken form of words received the spotlight in the field of SLA. In regards to the modality through which vocabulary is acquired, it has been widely acknowledged that orthographic vocabulary size is often not fully equivalent with its phonological counterpart, and that learners might be able to recognise words only in one of the two

modalities (Aizawa et al., 2017; Kim, 2019; Milton, 2009; Milton & Hopkins, 2006; Milton et al., 2010; Mizumoto & Shimamoto, 2008).

As it has been mentioned above, there have been an increasing number of studies devoted to exploring the role of cognateness as a test-related characteristic. However, studies that compare orthographic and phonological word recognition of cognates by employing the same stimuli are needed. Additionally, the role of *nonword-cognates*, i.e. made-up words, whose form (written and/or spoken) overlaps to a great degree with real words in the learners' L1, has not yet been examined. Odds are that learners' behaviour is affected by these words in the cases in which their L1 prompts them to consider nonwords as real words.

Moreover, although current findings across vocabularies have revealed proficiency and age-related differences within EFL learners, the literature lacks studies that have investigated the impact of out-of-school exposure in general and the impact of the type and frequency of activities that learners engage in outside the traditional classroom settings on written and aural vocabulary measures in particular. Indeed, despite the abundant exposure to English in out-of-school environments, the activities that learners have contact with could yield optimal opportunities for vocabulary uptake in an unbalanced way across modalities.

3. *The current study: research questions and predictions*

The current study aims to investigate the extent to which the orthographic vocabulary size of EFL learners is equivalent to the phonological counterpart by means of two comparable vocabulary tests that tap into both aspects of word knowledge. It also attempts to shed light on the impact of cognates and nonword-cognates within and between the two vocabularies. Finally, this study examines the relationship between out-of-school exposure, operationalised as amount and types of activities, with the two vocabularies. To that end, this paper addresses the following research questions:

RQ_1 Are there differences between the orthographic and phonological vocabulary size in intermediate-advanced EFL university students?

RQ_2 What is the impact of cognates and nonword-cognates on orthographic and phonological vocabulary scores?

RQ_3 To what extent does amount of time engaged in different out-of-school activities correlate with orthographic and phonological vocabulary scores?

In reference to the first research question and on the basis of previous studies, differences in learners' orthographic and phonological vocabulary scores are expected. Research has consistently shown that EFL learners in intermediate or advanced stages of language learning tend to possess a bigger orthographic vocabulary size since they encounter new words predominantly in the written form (e.g. Milton, 2009; Mizumoto & Shimamoto, 2008). As for the second research question, (1) cognates and (2) nonword-cognates are predicted to have an impact on learners' vocabulary scores, resulting in a (1) positive or (2) negative effect. In addition, as the orthographic and phonological vocabulary scores will be compared, we expect cognates to have a more preponderant impact in their orthographic form since English cognates are often difficult to recognise for Romance language speakers when provided in their spoken form (Muñoz et al., 2018; Rodríguez, 2001). Concerning the third research question, we expect out-of-school exposure to play an important role in the participants' vocabulary size, and specifically that those activities that provide written input will be correlated with the orthographic vocabulary size to a greater extent than those activities that provide oral input, which are expected to be more highly correlated with the phonological vocabulary size.

4. *Methodology*

4.1. *Participants*

Although this study originally targeted Spanish-Catalan bilinguals, due to the unprecedented circumstances, an open call for Spanish-Catalan bilinguals and Italian intermediate-advanced EFL learners was set up on the university's Facebook groups of one university in Catalonia and one in North Italy. The initial sample consisted of 45 intermediate-advanced EFL university students, who volunteered to participate and consented to the data collection. However, 15 participants did not complete all the tests in the second session, leaving a total of 10 Spanish-Catalan and 20 Italian participants (28 females, 2 males). Their self-assessed level of proficiency ranged from B2 to C2 according to the Common European Framework of Reference for Languages (CEFR). They were second or third-year university students with the average age of 22.9. Since the instruments were originally designed for testing Spanish-Catalan bilinguals, they were adapted, undergoing the necessary modifications to suit the Italian participants.

4.2. *Instruments*

4.2.1. *Vocabulary size tests*

To assess learners' receptive vocabulary size, two comparable tests (OVS and PVS) were adapted based on V_Yes/No v.1.0 vocabulary test (Meara & Miralpeix, 2017). V_Yes/No vocabulary test assesses learners' lexical knowledge of the first 10 frequency bands by presenting 200 items, among which half are pseudowords to control for the effect of guessing. In adapting the vocabulary tests in this study, the items of V_Yes/No test were randomly divided into two halves of 100 items each (A and B, see Figure 1) and two parallel versions were created for measuring both orthographic and phonological vocabulary size (Appendix A). The sole difference between the two tests is the modality in which the stimuli are presented.

The orthographic vocabulary size test (OVS) consisted of two parts with 100 target items each. For the phonological vocabulary size test (PVS), a native male British speaker was recorded producing all the items in a recording booth[1]. A British speaker was chosen as learners in the target contexts are predominantly exposed to British English throughout their formal instruction and the words in the original vocabulary test follow British English spelling rules. In the exact same way as the OVS, the PVS was split into two halves with 100 target items each. The words were divided into blocks of 10 words each to facilitate learners maintaining their attention on the task at hand. Additionally, every item in the test was repeated twice, with a three-second pause between each item. The length of each half of the PVS was approximately 12 minutes and 20 seconds.

4.2.2. *Translation tasks*

The reliability of V_Yes/No vocabulary test as a means for measuring learners' lexical knowledge in English has sometimes been criticised (Beeckmans et al., 2001), since final scores are fundamentally based on learners' self-assessment. With the aim to triangulate the final scores of the vocabulary tests and examine another aspect of word knowledge, i.e. meaning-recall, twenty items of the original tests were randomly selected. These items were consequently divided into two halves containing ten items each, and they were presented either in their written or spoken form (Figure 1). The construction of these tasks followed the same criteria of the vocabulary tests, and during a testing session participants were administered with one half of the items presented in their written form, and the other half delivered aurally (Appendix B). For the phonological translation tasks, the target items

[1] Audacity was used to edit the recordings, normalise the voice and reduce the background noise.

were produced by the same native British speaker of the PVS twice and with a 10 second break between each item, in order to provide sufficient time for the translation into the L1.

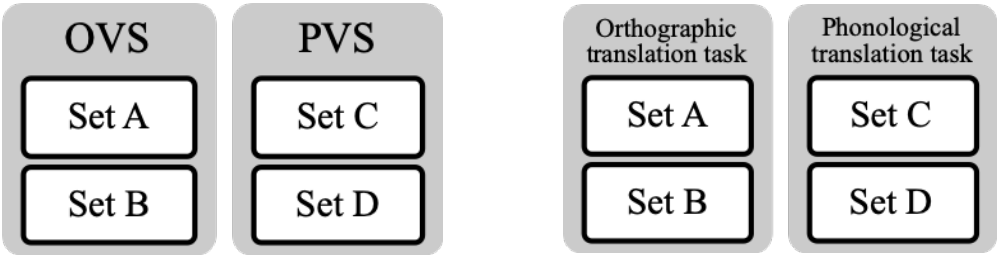

Figure 1: OVS = orthographic vocabulary size, PVS = phonological vocabulary size

4.2.3. *Background questionnaire*

Biodata information and data related to the type and frequency of out-of-school exposure in English were obtained through a background questionnaire in English (Appendix C). The questionnaire elicited information in regards to a broad number of activities, e.g. listening to music, reading, watching subtitled (L1) or captioned (L2) audio-visual material, chatting on the internet, gaming, using applications, and further English contact at university and at home. It also included questions related to formal instruction, and specifically the modality of input in English that learners were exposed to throughout schooling.

4.3. *Procedure*

This research was initially planned to be conducted in a classroom with two groups of participants. However, due to the unforeseen circumstances, digital versions of all of the instruments were created and all phases of the study took place online. The administration of this study was divided into two sessions with a three-week gap in between (see Table 1), and the participants of this study were randomly divided into two comparable groups. In the first session, one of the groups (Group A) started with half of the OVS and then moved to half of the PVS, whereas the other group (Group B) was administered with the reverse condition in order to counterbalance the order of tests administered. It is estimated that it would take approximately twenty minutes for the participants to complete the vocabulary tests online. The online vocabulary tests included instructions, a practice trial, and an informed consent form. Once they had completed both vocabulary tests, they moved on to the translation tasks. Each group was administered with a version of the translation task in which words were written down, and another in which stimuli were presented aurally. Those participants who started with the OVS (Group A) began with the aural translation task and vice versa. The online

translation tasks included instructions and a practice trial. The translation task phase lasted approximately six minutes. Finally, the participants were asked to fill in the background questionnaire.

In the second session, participants were tested again with their remaining halves of the vocabulary tests and translation tasks but in the reverse condition; those participants who had started with the aural test in the first session started now with the written test and vice versa. The procedure was the same as in the first session. After the translation tasks, learners were asked to answer a couple of questions related to their behaviour after the first session and during the second session; i.e. if they had checked some of the items in dictionaries or remembered some of the items from the first session during the second one.

Table 1: Data collection procedure

	Group 1			**Group 2**		
1st session	*OVS*	A		*PVS*	D	
	PVS	D		*OVS*	A	
	Translation tasks	D	A	*Translation tasks*	A	D
	Background questionnaire			*Background questionnaire*		
2nd session	*PVS*	C		*OVS*	B	
	OVS	B		*PVS*	C	
	Translation tasks	B	C	*Translation tasks*	C	B

5. *Data analysis*

5.1. *Cognates coding*

The target items in the vocabulary tests were coded categorically as either cognates or non-cognates on the basis of their etymology. Within the two hundred items of the whole test, fifty-five cognates with Spanish, Catalan and Italian were identified. In addition, fifteen words which overlapped with real words in Spanish, Catalan and Italian were identified and coded as nonword-cognates (Appendix D).

5.2. *Vocabulary tests*

Both the OVS and PVS were assessed by following the criteria of V_Yes/No test (Meara & Miralpeix, 2017), and a final score of test-takers' vocabulary size was obtained by taking into account the *hits* (yes responses to real words), and *false alarms* (yes responses to made-up words). Some items were not considered for the analysis since albeit nonwords in their written form, they were pronounced as real words in the phonological vocabulary test[2]. Moreover, some of the target-items were homophones in the PVS with high frequency words (e.g. loan – lone, wood – would). The presence of homophones in phonological vocabulary tests that assess learners' lexical competence by selecting words from different frequency bands could represent a crucial issue since learners' responses might potentially not be representative of the tested frequency.

5.3. *Preliminary analysis*

To explore the reliability and validity of the instruments, correlations and reliability analyses were conducted with SPSS. The outcomes of the translation tasks were also examined to triangulate the results of the vocabulary tests. Since this study targeted EFL learners with different mother tongues, differences in the OVS and PVS scores across the participants' L1 were investigated. The descriptive statistics reported in Table 2 revealed that the Italian participants had an orthographic and phonological vocabulary size slightly higher than the Spanish-Catalan group. An independent sample *t*-test was conducted to examine if the difference between the two cohorts was significant. The analysis produced a non-significant *t*-value both for OVS [$t(28) = .56$, $p = .58$)] and for PVS [$t(28) = .19$, $p = .85$], revealing statistically non-significant differences. The participants were thus assigned to a single group (N=30).

Table 2: Mean vocabulary size scores split by L1

L1	Vocabulary test	N	M	SD
Italian	OVS	20	7153.65	1073.34
	PVS	20	6071.35	1134.91
Spanish/Catalan	OVS	10	6943.6	704.84
	PVS	10	5985.1	1285.42

[2] *charlett as the word chalet; *surmon as the word sermon.

The results of the reliability analyses reported good internal consistency of both OVS and PVS, with a Cronbach alpha coefficient of .91 and .88 respectively. In addition, the correlation between the participants' responses in OVS and PVS was investigated using Pearson correlation coefficient test, and the results revealed a strong, positive correlation between the two vocabulary modalities ($r = .72$, $p < .001$). A strong correlation was expected as the underlying construct upon which the vocabulary tests were created employed the same target-items, number of words, and measurement method.

To explore the relationship between the translation tasks and orthographic and phonological vocabulary size tests, the participants' responses in the translation tasks were coded as either correct (1) or wrong (0), and a Pearson correlation coefficient test was run. The findings (Table 3) disclosed moderate and strong positive correlations among the four tests. The cases in which learners' correct or wrong responses in the vocabulary test matched their responses in the corresponding translation task (henceforth *match condition*) or they did not (henceforth *mismatch condition*) were then examined. The results in Table 4 show that the participants' performance in the translation task and vocabulary test matched by more than 90%, whereas in the phonological tests the rate of matched answers was slightly above 80%. The results in the translation test reaffirmed the accuracy of participants' responses in the vocabulary tests and the validity of V_Yes/No as a means for assessing EFL learners' vocabulary size.

Table 3: Pearson correlation coefficient test between translation tasks and vocabulary tests

	1	2	3	4
1. Orthographic translation	1	.67**	.69**	.49**
2. Phonological translation		1	.65**	.49**
3. OVS			1	.47**
4. PVS				1

**p <.01, *p <.05

Table 4: Percentage of match and mismatch responses between translation tasks and vocabulary tests

	Orthographic tests (%)	Phonological tests (%)
Match condition	90.17	80.36
Mismatch condition	9.83	19.64

6. *Results*

6.1. *Orthographic and phonological vocabulary size*

Participants' responses to the vocabulary tests and their final scores were transferred into an SPSS dataset. The descriptives revealed that the participants overall had a higher OVS than PVS as shown in Table 5. To examine whether these differences were significant, a paired samples *t*-test was conducted. The findings revealed that OVS was significantly higher than PVS [$t(29) = 6.95, p < .001$]. Cohen's *d* value (1.27) revealed a large effect size.

Table 5: Mean scores for OVS and PVS

	N	M	SD
OVS	30	7083.63	958.71
PVS	30	6042.6	1165.5

6.2. *Cognates and nonword-cognates*

Table 6 reports the frequencies of participants' responses to OVS and PVS test items according to whether they were words or nonwords and then cognates or non-cognates (coded as correct = 1 and wrong = 0). Both for OVS and PVS respectively, the percentages indicated higher accuracy in participants' responses to cognate words (84.93% and 78.01%) and nonword-non-cognates (93.47% and 82.24%). In contrast, lower accuracy was found in participants' responses to real words that were non-cognates with their L1 (63.58% and 62.51%) and nonword-cognates (69.89% and 65.59%), as shown in Figure 2.

Table 6: Participants' correct and wrong responses to OVS and PVS split by wordness and cognateness

Wordness	Cognateness	Accuracy	OVS (%)	PVS (%)
Word	Cognate	Correct	84.93	78.01
		Wrong	15.07	21.99
	Non-cognate	Correct	63.58	62.51
		Wrong	36.42	37.49
Nonword	Cognate	Correct	69.89	65.59
		Wrong	30.11	34.41
	Non-cognate	Correct	93.47	82.24
		Wrong	6.53	17.76

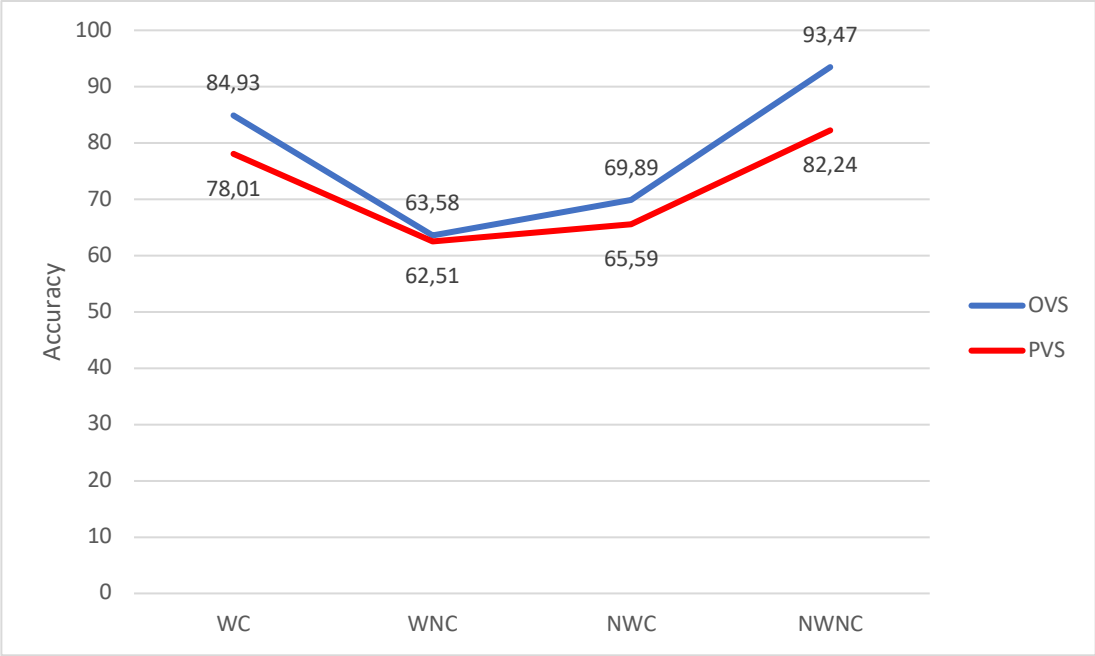

Figure 2: Accuracy scores of participants' responses in the vocabulary tests. Y-axis denotes accuracy rate, whereas in X-axis the four conditions are represented: word – cognate (WC), word – non-cognate (WNC), nonword – cognate (NWC), and nonword – non-cognate (NWNC).

Two generalised linear mixed models (GLMM) were performed to examine the impact of cognateness and wordness on learners' correct responses in the two vocabulary tests. Wordness and cognateness were defined as fixed factors, whereas subject was modeled as random factor. Results of the analysis with OVS as the dependent variable, revealed that wordness, cognateness and the interaction between wordness and cognateness significantly contributed to the model (Table 7). Bonferroni post-hoc analysis revealed a significant main effect of wordness [$F(1,1206) = 60.62$, $p < .001$] where nonwords obtained more correct answers than words, and cognateness [$F(1,6196) = 15.76$, $p < .001$] where responses to non-cognate words were more accurate than to cognate words (Table 8). Moreover, the results disclosed significant differences between WC and WNC [$F(1,458) = 154.94$, $p < .001$], and between NWC and NWNC [$F(1,448) = 92.93$, $p < .001$]. In the former case, learners' lexical choices were facilitated by the presence of cognate words, as their accuracy rate increased. In the latter, however, the presence of nonword-cognates negatively affected participants' responses, resulting in a decrease in the accuracy rate (Table 9).

Table 7: GLMM with OVS as the dependent variable

Terms	Coeff	SE	t	Sig	Exp Coeff	95% CI for Exp Coeff	
						Lower	Upper
Intercept	1.77	.1	17.97	< .001	5.86	4.81	7.13
Wordness	-.9	.12	-7.34	< .001	.41	.32	.52
Cognateness	-1.19	.09	-13.48	< .001	.3	.26	.36
Wordness* Cognateness	3.04	.16	19.36	< .001	20.79	15.29	28.27

Table 8: OVS - Pairwise comparisons with individual factors

Factor	Group	$\bar{X}$ (SE)	df	F	*p*
Wordness	Word	.76(.02)	1,1206	60.62	< .001
	Nonword	.86(.01)			
Cognateness	Cognate	.79(.02)	1,6196	15.76	< .001
	Non-cognate	.84(.01)			

Table 9: OVS - Pairwise comparisons with interaction effects

Condition	$\bar{X}$ (SE)	df	F	*p*
WC	.85(.01)	1,458	154.94	< .001
WNC	.64(.02)			
NWC	.7(.03)	1,448	92.93	< .001
NWNC	.94(.01)			

The results of GLMM with PVS as the dependent variable indicated that wordness, cognateness and the interaction between wordness and cognateness significantly contributed to the model ($p < .001$) (Table 10). Table 11 shows that pairwise comparisons revealed a significant main effect of wordness [$F(1,6196) = 8.95$, $p < .01$], where nonwords were correctly identified to a larger extent than words. However, cognateness did not reach significance [$F(1,6196) = .94$, $p > .33$], revealing that the amount of correct responses with cognate words or nonwords did not significantly differ from the non-cognate counterparts. Thus, it appears that in PVS the role of cognateness was

smaller than in OVS. Crossing analyses with the two factors combined revealed significant differences between WC and WNC [$F(1,458) = 85.89$, $p < .001$], and between NWC and NWNC [$F(1,448) = 49.25$, $p < .001$] (Table 12). Following the pattern in OVS, learners' correct answers significantly increased when they encountered cognate words than non-cognate words, whereas, when nonword-cognates were presented, the similarity of the target items with learners' L1 negatively affected learners' lexical decision as their accuracy rate significantly decreased.

Table 10: GLMM with PVS as the dependent variable

Terms	Coeff	SE	t	Sig	Exp Coeff	95% CI for Exp Coeff	
						Lower	Upper
Intercept	1.29	.09	15.03	< .001	3.64	3.07	4.32
Wordness	-.63	.12	-5.51	< .001	.53	.42	.67
Cognateness	-.77	.08	-9.47	< .001	.46	.4	.54
Wordness* Cognateness	1.67	.14	12.14	< .001	5.34	4.07	6.99

Table 11: PVS - Pairwise comparisons with individual factors

Factor	Group	$\bar{X}$ (SE)	df	F	*p*
Wordness	Word	.71(.02)	1,6196	8.95	< .01
	Nonword	.75(.02)			
Cognateness	Cognate	.73(.02)	1,6196	.94	n.s
	Non-cognate	.74(.01)			

Table 12: PVS - Pairwise comparisons with interaction effects

Condition	$\bar{X}$ (SE)	df	F	*p*
WC	.78(.02)	1,6125	85.89	< .001
WNC	.63(.02)			
NWC	.66(.03)	1,6196	49.25	< .001
NWNC	.83(.01)			

6.3. *Out-of-school exposure and vocabulary size scores*

Table 13 displays seven types of out-of-school activities and the self-reported frequency (hours per week) from the participants. The descriptive statistics suggested that watching captioned or subtitled audio-visual material, reading and listening to music were amongst the most popular activities.

Table 13: Frequency of out-of-school activities (hours/week)

	M	SD
Watching subtitled audio-visual material	9.71	8.18
Watching captioned audio-visual material	8.11	6.78
Reading	6.83	8.71
Listening to music	5.40	3.62
Chatting	2.23	1.84
Speaking	1.90	1.52
Using applications	1.63	1.11

Note: as none of the participants engaged in gaming activities, this variable was eliminated from the analysis.

A series of Spearman correlations were conducted to examine the relationship between the amount of weekly hours spent on each activity and the vocabulary scores. The number of participants for speaking and using applications was lower than 8, and correlations were not performed with these two categories. The results revealed significant correlations between OVS and three types of activities, namely, listening, reading and watching captioned audio-visual material (Table 14). On the other hand, PVS scores strongly correlated with reading.

Table 14: Spearman's correlation between out-of-school activities and vocabulary scores

	Listening	Reading	Watching	Chatting
OVS	.447*	.417*	.456*[1]	-.139
PVS	.205	.605**	.288[2]	.-048

**p <.01, *p <.05. Note: [1] = watching with captions, [2] = watching with captions or subtitles

To further explore the relationship between the amount of input and vocabulary scores, the activities were grouped into two categories according to the input modality: auditory input (listening to music, watching audio-visual material) and written input (reading, watching captioned audio-visual material, chatting). The OVS scores significantly correlated with both variable groups (auditory input and written input, Table 15). Further, the PVS scores strongly correlated with written input, whereas the correlation between PVS and auditory input was only moderate.

Table 15: Spearman's correlation between grouped variables and vocabulary scores

	Auditory input	Written input
OVS	.536**	.481**
PVS	.420*	.624**

**p <.01, *p <.05.

7. *Discussion*

This study assessed EFL learners' orthographic and phonological lexical competence by means of two vocabulary size tests which have proven to be reliable and comparable measurements. The translation task confirmed that learners' lexical choices are to a great extent representative of their receptive vocabulary, as learners' correct responses in the vocabulary tests substantially matched their responses in the translation tasks.

The first research question aimed to examine whether there are differences between the orthographic and phonological vocabulary size in intermediate-advanced EFL learners. The findings of the present study corroborate the results of previous studies with participants with similar proficiency levels (Aizawa et al., 2017; Milton & Hopkins, 2006; Milton et al., 2010, Mizumoto & Shimamoto, 2008), demonstrating a clear discrepancy between the orthographic and phonological lexical knowledge in Spanish-Catalan and Italian university students. Although the group was split by L1 to examine language-related differences, the results revealed no significant differences and a recurrent pattern among the participants. A bigger orthographic vocabulary was expected as learners' opportunities to encounter, and ultimately acquire, new words in their written form proportionally increase in accordance with their proficiency level (Milton, 2009). Indeed, while the majority of words encountered in their spoken form are likely to be acquired in the first stages of language acquisition, intermediate-advanced EFL learners could potentially come across unfamiliar low-

frequency words mostly through written sources. In line with other studies which examined the role of out-of-school exposure in university students or adults (Muñoz in press a), the participants in this study reported to frequently engage in activities that yield written input, which would create opportunities for vocabulary uptake in the orthographic form. All in all, this study lends support to the body of literature, suggesting that, with the exception of L1-Arabic learners (Alhazmi & Milton, 2015; Milton et al., 2010), the orthographic vocabulary of EFL learners in advanced stages of language acquisition is significantly bigger than its phonological counterpart.

The second research question intended to find evidence of the impact of cognates and nonword-cognates on learners' final scores. Since the V_Yes/No vocabulary size test assesses learners' vocabulary size by presenting both real words and pseudowords, among which there are many cognates and nonword-cognates with speakers of Romance languages, we aimed to explore whether learners' performance was significantly influenced by the presence of words which shared form with their L1. The results revealed that the presence of cognates in the vocabulary tests aided learners' orthographic and phonological word recognition, as the number of correct responses significantly increased when cognates with learners' L1s were delivered. These findings concur with previous studies which examined the role of cognates in vocabulary tests (Muñoz et al., 2018; Muñoz in press a), providing support to the facilitative effect of cognates. Furthermore, the results revealed that the participants in this study were predominantly facilitated by the presence of cognates when they were delivered in written form. This was not surprising, as the numerous differences between the phonological system of English as opposed to Romance languages often render more difficult the recognition of cognates in the aural form (Muñoz et al., 2018; Rodríguez, 2001). In Laufer & McLean's study (2016) with L1 Hebrew and Japanese beginner, intermediate and advanced EFL learners, the advanced learners' lexical decisions were not affected by the presence of cognates. In contrast, the results from this study indicated that intermediate-advanced participants extensively relied on cognates for word recognition. A possible explanation for this difference could lay in the nature of cognates among the languages tested. As the majority of cognates between English and Romance languages are low-frequency words, learners might be facilitated by the presence of cognates even in advanced stages of language acquisition when the opportunities to encounter new words which are also cognates are superior. However, developmental studies with Romance L1 language speakers with different proficiency levels could provide insights into the impact of cognates across proficiency level, and whether the cognate facilitation effect gradually decreases with greater proficiency.

This study's findings also reported that the participants' correct responses significantly decreased when they encountered imaginary words which bore resemblance with their L1, revealing

a directional relationship between cognateness (either real cognates or nonword-cognates) and participants' lexical responses. While imaginary words which were not cognates were accurately identified as made-up words, the apparent similarity in the written or spoken form of nonword-cognates prompted test-takers to erroneously associate those items to words in their mother tongue and, subsequently, to consider them as real words. This is a valuable finding of the present study since, to the author's knowledge, no previous studies have explored the role of nonword-cognates in vocabulary size tests. Although the participants in this study were intermediate-advanced learners, it appears that they were still negatively affected by the presence of nonword-cognates. We expect that this effect would be even more noticeable in low-proficient learners, who might not be yet familiar with the morphology of the L2 (Meara & Miralpeix, 2017). As the facilitative role of cognates for word recognition has become evident, an increasing number of studies have been controlling for cognateness when administering a vocabulary size test. However, this study provides evidence that researchers should equally control for nonword-cognates in the cases in which the vocabulary size tests present imaginary words. This would be highly necessary in studies which compare learners whose L1s differ, and in particular with beginning learners, as research has shown that they rely on cognates to a larger degree.

Regarding the third research question, the detailed questionnaire in which participants had to quantify their weekly exposure to out-of-school activities in English disclosed that they were frequently and regularly exposed to English outside the classroom. In agreement with previous studies that examined the type and frequency of out-of-school activities that EFL university learners engage in (Muñoz, 2020), watching subtitled and captioned audio-visual input, reading and listening to music emerged as the preferred activities in the participants of this study. Conversely, none of the participants claimed to play video-games in English, although future studies with a larger sample size are needed to examine and quantify the frequency of learners' engagement in gaming activities. These results seem to support the few studies on out-of-school exposure in which a significant decrease in gaming activities in favour of reading-related activities as a result of aging was found (Muñoz, 2020; Peters, 2018).

The results of correlation analyses revealed significant relationships between OVS and both grouped variables, namely, auditory and written input. Specifically, moderate positive correlations between listening to music, reading, watching captioned audio-visual material in English and OVS emerged. Previous studies often found null or negative correlations between vocabulary scores and listening to music in primary and middle-school EFL learners in different contexts since it appears that they do not pay attention to the lyrics (De Wilde et al., 2019b; De Wilde & Eyckmans, 2017; Muñoz et al., 2018). Nevertheless, it is likely that age-related differences could shed light on the

beneficial role of listening to music across ages, as older learners might be more cognitively mature and interested in knowing the lyrics of the songs that they are listening to. The participants of this study claimed to often look up the lyrics and the meaning of the songs (with an average of 7.8 out of a 10-point Likert scale). This would consequently turn listening to music into a great asset for vocabulary gains, being one of the most popular activities that learners have contact with.

Furthermore, in line with previous studies, reading and watching captioned audio-visual material revealed moderate correlations with orthographic vocabulary size (Muñoz et al., 2018; Peters, 2018; Peters & Webb, 2018). In regards to the former, research has revealed that despite the limited engagement of primary or secondary-school children, reading is often the main predictor of vocabulary development (Peters, 2018). Moreover, as aforementioned, advanced learners predominantly encounter new words in their written form, and thus, reading-activities would create the potential for vocabulary uptake. With respect to watching captioned audio-visual material, previous studies have shown that the simultaneous exposure to input in different modalities would enhance the opportunities for vocabulary gains in the orthographic form (Koolstra & Beentjes, 1999; Muñoz et al., 2018; Peters, 2018; Peters & Webb, 2018).

Also PVS was significantly correlated with both auditory and written input. In particular, a significant and strong correlation between PVS and reading was found. A possible explanation for this unexpected result could lay on the process of decoding and recoding during reading. When learners are exposed to written input, they create graphemic-phonemic images by decoding the graphemes and matching them to phonemes (Birch, 2007; Ehri, 1998). Therefore, despite reading yields only written input, this study suggests that it is equally or partially beneficial for vocabulary development in the phonological form as well. Since the small sample size of this study limits the generalisability of this study, future studies with a larger pool of participants which investigate the role of reading for vocabulary development in different modalities of word recognition are needed.

8. *Conclusions and pedagogical implications*

The present study aimed to compare the orthographic and phonological vocabulary size of intermediate-advanced EFL learners and evaluate the impact of cognateness and out-of-school exposure across two modalities of word recognition. The findings demonstrated clear superiority of the orthographic vocabulary size over the phonological counterpart. Moreover, cognates and nonword-cognates appeared to yield a considerable effect in the final scores of the orthographic

vocabulary test. Additionally, positive correlations emerged between out-of-school exposure and vocabulary scores, and the results indicated that different activities might be diversely beneficial to vocabulary development amongst written and aural modalities.

Future studies could improve on several methodological issues of this study. Using bigger sample size could inform researchers more accurate results of the impact of out-of-school exposure in the development of orthographic and phonological vocabularies. Furthermore, even though this study was conducted online due to the current situation, forthcoming classroom-based research are needed, as researchers could control for external factors such as test completion. Researchers could also control for gender, which has proven to play a central role in the frequency and type of activities that EFL learners have contact with. Phonological vocabulary size has only recently come into the spotlight in linguistic research, and further studies on the impact of cognateness and out-of-school exposure across L1s, proficiency and ages, as well as the extent to which vocabulary scores are associated with proficiency measures and the four sub-skills, are expected[3]. Concerning the evidence of a large gap between the orthographic and phonological vocabulary size in intermediate-advanced EFL learners, the results of this study provide pedagogical implications. Based on the results from this study, second language vocabulary development should not solely focus on orthographic form, which is often delivered in traditional settings. With the view to amplify learners' lexicon, the abundance of phonological input which could often be found through out-of-school exposure should be cooperated in language classrooms. In doing so, not only English learners could benefit from the diversified vocabulary learning opportunities, but teachers can take this as initiatives to broaden their teaching curricula by promoting English vocabulary learning through different modalities.

9495

[3] Originally, this study also aimed at exploring the relationship between vocabulary scores in two modalities and listening and reading scores. The current circumstances made however infeasible the administration of the listening and reading comprehension tasks online. Nevertheless, two standardised tests appropriate for the sample of participants of this study were selected for future studies. Under different situations, we would have employed the listening part of the Oxford Placement Test (OPT) for listening comprehension, and a TOEFL reading test for reading comprehension.

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Appendix A

Examples of the pen-and-paper versions of the orthographic and phonological vocabulary size tests

Informed consent: I give my consent for the data collected to be used exclusively for research purposes. I understand that it will be held in the strictest confidentiality and that no report will reference me by name.
Name and surname:

Do you know the meaning of these words?

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- If you know the meaning of a word (translation), put a tick ✅.
- If you don't know the meaning or if you are not sure, please don't tick the word.
- Do not guess. There are words that do not exist and your score will be reduced for guessing!

- ☐ floralate
- ☐ scobie
- ☐ windle
- ☐ nonagrate
- ☐ analyse
- ☐ concerned
- ☐ obstinate
- ☐ modesty
- ☐ decisively
- ☐ trill
- ☐ castle
- ☐ greenaway
- ☐ elegance
- ☐ self-respect
- ☐ department
- ☐ frown
- ☐ discuss
- ☐ furrow
- ☐ couth
- ☐ cunnion
- ☐ whaley
- ☐ scenery
- ☐ cundy
- ☐ stephonise
- ☐ adjoin
- ☐ cardination
- ☐ greer
- ☐ costliness
- ☐ postscript
- ☐ harridism
- ☐ fearle
- ☐ diversal
- ☐ menace
- ☐ intuned

- ☐ cordonise
- ☐ malicious
- ☐ pickard
- ☐ bibby
- ☐ pegler
- ☐ prosaic
- ☐ germ
- ☐ wookey
- ☐ ottery
- ☐ undergraduate
- ☐ steadily
- ☐ thrift
- ☐ atribus
- ☐ bought
- ☐ todd
- ☐ gummer
- ☐ custom
- ☐ sedgebeer
- ☐ leucan
- ☐ gammage
- ☐ numb
- ☐ varney
- ☐ watler
- ☐ practicate
- ☐ gammonary
- ☐ lose
- ☐ exemptation
- ☐ pocock
- ☐ barmion
- ☐ drab
- ☐ lucky
- ☐ mourant
- ☐ engineer
- ☐ swan
- ☐ flautism

- ☐ asbestial
- ☐ guest
- ☐ bayonet
- ☐ piccolotomy
- ☐ powling
- ☐ dressy
- ☐ pilbean
- ☐ breakwith
- ☐ interfere
- ☐ advise
- ☐ albucolic
- ☐ remove
- ☐ derelict
- ☐ allaway
- ☐ cranicle
- ☐ purchaser
- ☐ fastidious
- ☐ resignate
- ☐ tomb
- ☐ tranquil
- ☐ candish
- ☐ reticence
- ☐ motivise
- ☐ raisin
- ☐ quote
- ☐ ethical
- ☐ appreciate
- ☐ lone
- ☐ safe
- ☐ givewith
- ☐ whereabouts

Informed consent: I give my consent for the data collected to be used exclusively for research purposes. I understand that it will be held in the strictest confidentiality and that no report will reference me by name.

Name and surname:

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Do you know the meaning of the words that you hear?

- Select the left column if you know the meaning of the word that you hear, or the right column if you don't or if you're not sure. Put a tick ✅.
- You will have a few seconds to tick the column, then the recording will continue. Every ten words a new block of words will start.
- Do not guess! You will hear words that do not exist and your score will be reduced for guessing.

Block 1

I know the meaning of the word	I don't / I am not sure

Block 2

I know the meaning of the word	I don't / I am not sure

Block 3

I know the meaning of the word	I don't / I am not sure

Block 4

I know the meaning of the word	I don't / I am not sure

Block 5

I know the meaning of the word	I don't / I am not sure

Block 6

I know the meaning of the word	I don't / I am not sure

Block 7

I know the meaning of the word	I don't / I am not sure

Block 8

I know the meaning of the word	I don't / I am not sure

Block 9

I know the meaning of the word	I don't / I am not sure

Block 10

I know the meaning of the word	I don't / I am not sure

Appendix B

Examples of the pen-and-paper versions of the translation tasks

Aural translation task

Name and surname:

Translate the words that you hear into your own language. All the words will be repeated twice, and you will have ten seconds to translate them.
Be careful, some of the words do not exist! If you spot them, leave a blank space. We will start with one example.

	Translation
Example: spring	*primavera*
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	

Written translation task

Name and surname:

Translate the words into your own language as in the example. **Be careful**, some of the words do not exist! If you spot them, leave a blank space.

	Translation
Example: spring	*primavera*
displace	
scobie	
whaley	
varney	
corn	
fountain	
sedgebeer	
keir	
copper	
compress	

Appendix C

Questionnaire

Questionnaire: English in Everyday Life

Please take a moment to fully answer the following questions regarding your language experience. All information is confidential; please answer the questions as accurately as possible. Your name will in no way be associated with this information or the data you provide. It will take approximately 10 minutes.

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A. Personal information

1. **Name and surname:**_____

2. Gender: ___ Male ___ Female ___Prefer not to say

3. Age: _____

4. Country of birth: _____

5. What is your native language? You can pick more than one.
   - ☐ Spanish
   - ☐ Catalan
   - ☐ Other(s) _____

6. What other languages do you have knowledge of? You can pick more than one.
   - ☐ English
   - ☐ German
   - ☐ French
   - ☐ Italian
   - ☐ Other(s) _____

7. Have you ever been to an English speaking country? If yes, for how long?
   - ☐ Yes, _____
   - ☐ No

8. Do you speak English with any family members or close friends? If yes, how many hours do you speak with him/her/them per week?
   - ☐ Yes, _____ hours
   - ☐ No

9. Do you speak English at home? If yes, for how many hours per week?
   - ☐ Yes, _____ hours
   - ☐ No

B. Listening to music

1. How many hours do you listen to music in English per week? *(If you don't, go to section C)*

   ☐_____hours

   ☐ I don't listen to English music.

2. Do you pay attention to the lyrics when you listen to English music? Tick one of the boxes in the scale below, where 1 means **never** and 10 means **always**.

1. Never

1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**

10. Always

C. Reading

1. How many hours do you spend reading in English per week? *(If you don't, go to section D)*

□_____hours

□ I don't read in English.

2. Do you check for the meaning or the translation of the words you don't know? Tick one of the boxes in the scale below, where 1 means **never** and 10 means **always**.

1. Never

1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**

10. Always

D. Watching

1. How many hours do you spend watching TV / movies / series / Youtube videos in English per week? *(If you don't, go to section E)*

□_____hours

□ I don't watch TV / movies / series / YouTube videos in English.

2. When you watch TV / movies / series / YouTube videos in English, do you use subtitles? Tick one of the box in the scale below, where 1 means **never** and 10 means **always**. *(If you don't, go to section E)*

1. Never

1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**

10. Always

3. In which language do you use subtitles?
□ Spanish or Catalan
□ English
□ Other_____
□ I don't use subtitles.

E. Chat on the internet

1. Do you chat on the internet in English? If yes, how many hours do you spend chatting on the internet in English per week?

□ Yes, _____hours

□ No, I don't chat on the internet in English.

F. Video games

1. Do you play video games in English? If yes, how many hours do you play video games in English per week?

   □ _____ hours.

   □ I don't play video games in English.

G. English at university and at home

1. Do you use applications to learn English? If yes, how many hours do you spend using these applications per week?

   □ Yes, _____ hours

   □ I don't use applications to learn English.

2. Besides English classes at the university, do you take other English classes? If yes, how many hours per week?

   □ Yes, _____ hours

   □ I don't take extra English classes.

3. Did you take any CLIL courses in English?

   □ Yes
   □ No

4. How many months did they last?

   _____

5. In your English classes, which were the most common activities that you used to do? (e.g. listening, reading, speaking, writing)

   _____

6. How much time do you think you devoted to listening in English at school when you were younger?
   _____%
   And to reading? _____%

7. And at home?
   Listening _____%
   Reading _____%

8. Do you have any other current contact with English?

   _____

Thank you for your participation!

Appendix D

List of cognates and nonword-cognates

Cognates

acute	malicious	adjoin
tranquil	elegance	insinuate
concerned	analyse	engineer
appreciate	rumour	bayonet
sincere	undergraduate	application
scamper	stimulation	invest
redemption	decisively	displace
alternate	fresh	advise
reticence	honesty	expand
precocious	derelict	precious
castle	fastidious	obstinate
ostensibly	refusal	prosaic
inhabitant	elaborate	sanitary
menace	tomb	custom
modesty	self-respect	compress
embarrassment	department	interfere
scenery	discuss	tuber
orphan	fountain	germ
remove		

Nonword-cognates

intimant	innoculism	albucolic
elphick	resignate	practicate
exemptation	voluminary	motivise
flautism	diversal	hypodemical
integrality	incorpulent	atribus